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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/688,533
Filing Date: October 16, 2003
Appellant(s): LUZ ET AL.

Gerard A. Messina

For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 08/14/2009 appealing from the Office Action mailed 12/30/2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after the final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

Whether claims 1-3, 6-8, 10-12, and 15-22 should be rejected under 35 USC §103(a) as being unpatentable over U.S. Patent No. 2004/0048142 issued to Marusak et al. in view of U.S. Patent No. 6,690,140 issued to Larson, in further view of U.S. Patent No. 5,739,737 issued to Hatton.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

2004/0048142	Marusak et al.	2004
6,690,140	Larson	2004
5,739,737	Hatton	1998

(9) Grounds of Rejection (The following is the Final Action mailed 12/30/2008)

DETAILED ACTION

Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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Claims 1-3, 6-8, 10-12, 15-18 and 19-22 are rejected under 35 U.S.C. 103[a] as being unpatentable over Marusak [U.S. 20040048142] in view of Larson [U.S. 6690140] in further view of Hatton [U.S. 5739737].

With respect to claim 1 [Currently Amended], Marusak teaches a vehicle electrical system [pars. 0001-0002] powered by a battery [Fig. 1 battery 12] to supply a plurality of loads [par. 0011 lines 1-4; par. 0033 lines 1-5; Fig. 2 power feed output connectors 80, 82, 84, 86], comprising: an integrated module [Fig. 1, power management and distribution assembly 10] positioned between a positive terminal of the battery and the plurality of loads [par. 0031 lines 1-5], the integrated module having: an arrangement for detecting a state of charge of the battery [par. 0010 lines 1-5, par. 0043 lines 8-12] and including a battery current measuring device [par. 0030 lines 1-6], and a terminal at which a generator is connectable [Fig. 2, the generator/alternator connects to either the battery positive terminal 16 or any of the power connectors 96-110; par. 0034]; one of a battery disconnecting switch [Fig. 2, cutout switch assembly 58; par. 0031] and a battery disconnecting fuse [Fig. 5, any of fuses 70; par. 0008 lines 1-5; par. 0011 lines 1-4; par. 0033] situated between the battery and the terminal; a control unit for power management [Fig. 5, energy management module 56; par. 0030] of the vehicle electrical system; at least one supply output for supplying power to the loads [pars. 0033-0034]; a fuse module [housing portion 18 contains fuses 70, as shown in Fig. 2] having an input, a plurality of supply outputs, and a plurality of fuses [Fig. 2, fuses 90, 92, 94] that connect the plurality of supply outputs to the input [par. 0033];

wherein a terminal of the integrated module is connected to the input of the fuse module, and wherein the plurality of supply outputs of the fuse module provide power to the plurality loads [Figs. 1 and 2, pars. 0031-0033], wherein the integrated module further includes an electronics unit for **at least one** of diagnosis of the generator [Figs. 1 and 5, 56 in conjunction with 58; par. 0029 lines 1-3; **par. 0010 lines 1-5 teaches diagnostics of the battery, which is effectively the same as diagnosis of the generator**; par. 0043 lines 8-14; the output of the battery is regulated to provide an output in a safe range; beyond that range, the safety circuits shut the battery off to protect it].

Marusak does not disclose an electronics unit for regulation of the generator, or a detection arrangement for diagnosis of a state of at least one of the fuses.

Marusak and Larson are analogous vehicle electrical system modules for managing power.

Larson discloses the vehicle electrical system wherein the integrated module [Fig. 2, ESC 30 is a module] further includes an electronics unit for at least one of regulation and diagnosis of the generator [col. 3 lines 43-53 describes how ESC 30, in combination with other controllers, execute a battery management program that regulates and diagnoses the battery/ pack by making adjustments to the generator output. Since the battery is electrically connected to the generator, the generator's electrical output is also effectively diagnosed].

At the time of the invention it would have been obvious to one of ordinary skill in the art to add the generator regulation/diagnostics feature found in Larson's module to Marusak's module, for the benefit of providing an integrated means for the vehicle electrical system to regulate and diagnose the battery/generator, and so adjust the rate of charging as required. This is an important requirement for any type of vehicle that could conceivably impact human safety [such as an automobile] or lead to equipment damage [an overcharged battery could result in an explosion]. Diagnosing the generator's charging of the battery is important, as neglecting this can lead to battery overheating, sulfation, and reduced battery life- Larson, col. 1 lines 40-65; as well as potential battery explosion].

The combination of Marusak and Larson do not disclose a detection arrangement for diagnosis of a state of at least one of the fuses.

Marusak, Larson, and Hatton are analogous vehicle electrical system modules for managing power.

Hatton discloses an integrated module [Fig. 1, blown fuse indicator module 10] with a detection arrangement for diagnosis of a state of at least one of the fuses [col. 2 lines 47-64; col. 4 lines 18-63].

At the time of the invention it would have been obvious to one of ordinary skill in the art to add Hatton's blown fuse indicator module to the combination of Marusak's and Larson's fused power management module.

The benefits for doing so would be to enhance convenience to the user in locating the blown fuse [Hatton, col. 1 lines 24-36], and allow the user/technician to be

more effective in diagnosing malfunctions, which would result in reduced downtime for the vehicle and reduced cost to the user.

The following applies to the placement of ALL of the limitations/features into one integrated module: the concept of taking multiple commonly known automobile components/modules/features and forming them into one integrated module is in general only a simple modification in the automotive arts [particularly considering the widespread use of modularization in this industry]; since it has been held that forming and putting together into one piece an article which has formerly been formed in two pieces involves only routine skill in the art. ***In re Larson, 340 F.2d 965, 968, 144 USPQ 347, 349 [CCPA 1965]. See MPEP 2144.04.***

With respect to claim 2 [Original], Marusak discloses that the arrangement for detecting the state of charge of the battery includes a battery current meter [par. 0030].

With respect to claim 3 [Original], Marusak discloses a battery voltage sensor located outside the integrated module [par. 0041, input pins for voltage sensing, from outside the module], wherein the arrangement for detecting the state of charge of the battery includes a battery voltage meter that cooperates with the battery voltage sensor. [Voltage meters for the visual determination of battery/charging voltage levels are conventional to the automotive industry, as illustrated by Baker (U.S. 5737168), col. 2 lines 19-36].

With respect to claim 6, [Currently Amended] Marusak discloses a switch [Fig. 2, cutout switch assembly 58; par. 0031] provided within the fuse module [housing portion 18 is the module that contains fuses 70, as shown in Fig. 2], wherein the switch enables

selective connection and disconnection between at least one of the plurality of fuses and an associated load.

With respect to claim 7 [Original], Marusak discloses a plurality of fuses; wherein the integrated module has a plurality of supply outputs, and wherein the plurality of fuses connect the plurality of supply outputs to the battery, whereby power is provided via the plurality of supply outputs to the plurality of loads [pars. 0031-0033].

With respect to claim 8 [Original], Marusak discloses a switch [Fig. 2, cutout switch assembly 58; par. 0031] provided within the integrated module, wherein the switch enables selective connection and disconnection between at least one of the plurality of fuses and an associated load [pars. 0031-0033].

With respect to claim 10 [Original], Marusak discloses a relay [Fig. 1, relays 64-66]; wherein the integrated module has a terminal for connection to a starter of the vehicle [Fig. 1, battery positive terminal 138; or any of power feed output connectors 80, 82, 84, 86 in Fig. 2], and wherein the relay is situated between the battery and the terminal of the integrated module.

With respect to claim 11 [Original], Marusak discloses a communications interface [par. 0030, CAN interface] for the integrated module; wherein the control unit for power management is in contact with at least one of the plurality of loads of the vehicle electrical system and an additional control unit [par. 0029, energy management subassembly 56] of the vehicle via the communications interface for the integrated module.

With respect to claim 12 [Original], Marusak discloses that the communications interface is a bus interface [par. 0030, CAN interface is a bus interface].

With respect to claim 15 [Original], Hatton discloses that the integrated module further includes a detection arrangement for diagnosis of a state of at least one of the fuses [Fig. 1, blown fuse indicator module 10; col. 2 lines 47-64; col. 4 lines 18-63].

With respect to claim 16 [Original], Marusak discloses that the integrated module further includes a DC-to-DC converter [par. 0043].

With respect to claim 17 [Original], Marusak discloses that the integrated module further includes at least one circuit breaker [Fig. 2, cutout switch assembly 58; par. 0031].

With respect to claim 18 [Original], Marusak discloses that the circuit breaker enables selective connection and disconnection of one of a single load and a plurality of loads from the integrated module [Fig. 2, cutout switch assembly 58; par. 0031. This switch can connect and disconnect single or multiple loads, depending on how many loads are (one or more) are connected to the power management module 10].

With respect to newly added independent claim 19: this claim combines the previously rejected claims 1, 2, 3, and 7 into one claim. Therefore the **combination of Marusak in view of Larson in further view of Hatton** used to reject claims 1, 2, 3, and 7 above apply to claim 19 equally.

With respect to newly added claim 20: this claim combines the previously rejected claims 16, 17, and 18 into one claim. Therefore the **combination of Marusak**

in view of Larson in further view of Hatton used to reject claims 16, 17, and 18 above apply to claim 20 equally.

With respect to newly added claim 21: this claim recites the previously rejected limitations of claim 6. Therefore the **combination of Marusak in view of Larson in further view of Hatton** used to reject claim 6 above apply to claim 21 equally.

With respect to newly added claim 22: this claim combines the previously rejected claims 10 and 11 into one claim. Therefore the **combination of Marusak in view of Larson in further view of Hatton** used to reject claims 10 and 11 above apply to claim 22 equally.

END OF ACTION

(10) Response to Arguments

1. Appellant's arguments in the appeal brief dated 08/14/2009 are addressed below in the order in which they are presented. The appellant's arguments and comments are **bolded**, with the examiner's response immediately following each argument/comment.

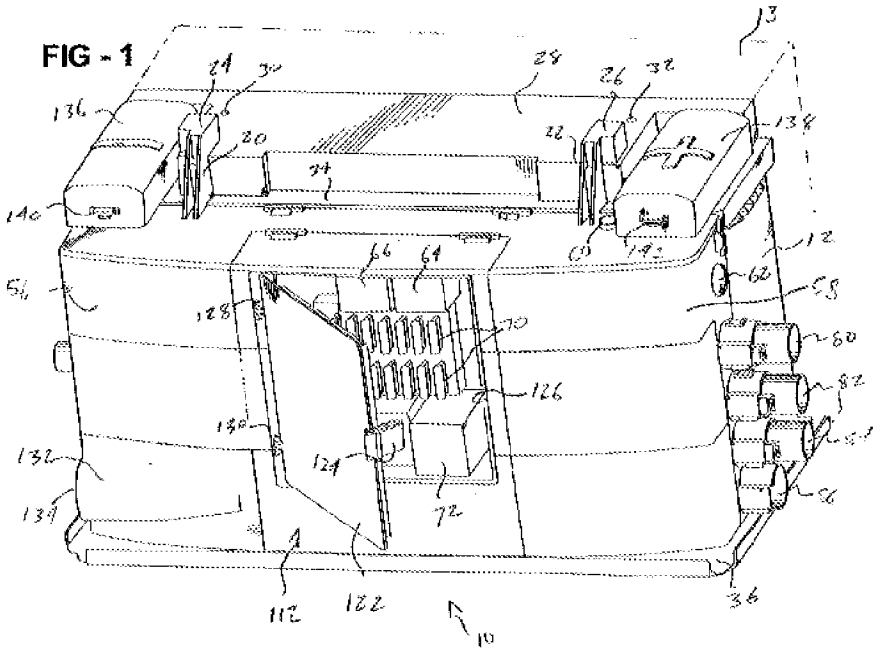
2. Appellant argues on page 12 of the brief that, "**The Marusak, Larson, and Hatton references do not disclose (or even suggest) the feature in which the integrated module further includes an electronics unit for at least one of regulation of the generator and diagnosis of the generator, as provided for in the context of claim 1**." The examiner disagrees. The limitation in question is found in independent claims 1 and 19, and reproduced below for analysis [referred to as ***limitation A*** herein]:

"*wherein the integrated module further includes an electronics unit for at least one of regulation of the generator and diagnosis of the generator*" [claims 1 and 19].

3. The examiner notes that ***limitation A*** above requires either the "regulation of the generator" or the "diagnosis of the generator" feature, but not both. Although not required to do so, the examiner has cited disclosures believed to show both features of ***limitation A***. The examiner has cited Marusak as teaching the "***diagnosis*** *of the generator*" feature [pages 3-4 of the Office Action]; and has cited Larson as teaching the "***regulation*** *of the generator*" feature [pages 4-5 of the Office Action]. Thus, the examiner only needs to prove that the 103 burden has been met by showing either one of the cited references teaches either feature (either "regulation of the generator", or "diagnosis of the generator"). However, in order to be fully responsive to appellant's

arguments, the examiner will respond to each argument as presented by the appellant as they relate to Marusak teaching the "**diagnosis** of the generator" feature [see paragraphs 4-10 below]; followed by responses made as they relate to Larson teaching the "**regulation** of the generator" feature [paragraphs 11-17 below].

4. As to appellant's argument on page 12 of the brief regarding the "**diagnosis** of the generator" feature: Marusak discloses a battery power management distribution assembly [equated to the recited "*integrated module*"; Fig. 1, power management and distribution assembly 10] for the protection and energy management of a battery [par. 0001, par. 0008, par. 0020]. The power management and distribution assembly 10 contains energy management subassembly 56 and cut-off switch subassembly 58 [equated to the recited "*electronics unit*" see Figs. 1 and 5, item 56 and 58; par. 0029] for at least one of …diagnosis of the generator [par. 0010; par. 0043].



Marusak [U.S. 2004/0048142] Figure 1 showing power management and distribution assembly 10.

Marusak's paragraph 10 states:

[0010] The energy management subassembly accomplishes functions such as emitting a diagnostic output signal representative of a measured condition of the battery and generating an overload signal in the event that the maximum operating parameters of the battery have been exceeded. The cut-off switch subassembly includes features such as tripping power from the battery in the instance of a signal received from the energy management module… [Emphasis added].

Marusak's paragraph 43 states:

[0043] …The further ability to integrate the energy management and cut-off switch subassemblies into the housing [i.e. energy management subassembly 10] enables the devices to work together to monitor the battery power, update the automobile computer as to the status of battery power, and can be used to cut the battery power to the electrical system when deemed necessary by the processor technology interfacing with the system [emphasis added].

5. An overloaded battery signal [which occurs in the event that the maximum operating parameters of the battery have been exceeded] serves as a suggestion to one of ordinary skill that *the generator regulator has effectively failed and is now either overcharging the battery and thus overloading it with charge; or the generator regulator has effectively failed and is now under-charging the battery resulting in the battery being unable to adequately supply its loads*. This is so because although the word regulator is not mentioned explicitly in Marusak, a generator regulator nonetheless must be present in Marusak's vehicle, otherwise the battery would become dangerously overcharged or

undercharged. This knowledge is well-known to one of ordinary skill in the art. Additionally, the generator regulator would be conventionally connected to the same vehicle + terminal that the battery and battery management system is connected to [Fig. 1, + terminal at 138; par. 0029; par. 0031. See also par. 0022, assembly 10 is for use with conventional battery systems]. Because of this conventional connection to the vehicle electrical system, a diagnosis of the battery condition at the positive terminal will additionally serve to diagnose the generator regulator which is connected to the same + terminal.

6. The appellant disagrees on page 12 by stating that "**The Final Office Action …conclusorily asserts that the feature of …diagnosis of the generator is found in paragraphs 10, 29, and 43 of the Marusak reference …and that …inherency concerns anticipation and not obviousness**." The examiner has not leaped to any unwarranted conclusions, nor invoked the doctrine of inherency. The examiner is relying on common knowledge available to one of ordinary skill in the automotive and vehicle battery charging arts; that regulators for vehicle generators are well-known [otherwise vehicle batteries would become dangerously overcharged or undercharged]; and further that it is well-known that a failure in the generator regulator would result in an overloaded [i.e. overcharged or undercharged] condition of the battery. As seen in par. 0010, Marusak's energy management subassembly emits an overload signal that is a diagnostic signal showing the maximum operating parameters of the battery have been exceeded. One of ordinary skill would understand this overload signal showing the maximum operating parameters as exceeded to be suggestive of an *overcharged*

condition of the battery, or *too much load applied to the battery*- in other words, an overloaded battery signal *serves as a suggestion of a failed generator regulator overcharging the battery [in the case of overcharge], or undercharging of the battery [in the case of being unable to adequately supply the vehicle load]*. In either case, the regulator has failed to properly charge the battery, and the generator regulator failure is detectable via Marusak's battery diagnostic feature as seen reproduced in par. 10 above.

7. The appellant argues on page 13 that, "**Accordingly, diagnosing a battery may merely lead to possible, unvalidated assumptions regarding the condition of a generator, but clearly is not the same as diagnosing a generator.**" The examiner submits that there are no unvalidated assumptions; however, even an assumption on the part of the vehicle operator or vehicle technician that the overloaded state of the battery was caused by a failed regulator would still lead to the diagnosis of a failed regulator [i.e. a failed generator regulator would be the main suspect, based upon common knowledge]. This would be true, even if there were any other unlikely scenarios that could have caused the overloaded state of the battery. The applicant further comments on page 12 of one scenario where a short circuit between the battery and measuring device could result in the overload condition. While this is not necessarily disagreed with, it is the examiner's understanding that statistically, this type of short circuit condition seldom occurs when compared to the known high failure rates of a complex mechanical/electrical component such as a generator regulator. That is, one with experience in this field would be more likely to at least initially conclude that an

overloaded battery signal was an indication of a failed generator regulator, and hence be more prone to troubleshoot/test the regulator first, versus attempting to troubleshoot/test the vehicle's wiring harness (or other unknown potential conditions) that could have instead caused the battery to overload. The examiner believes this to be reasonable, based on what is commonly known in the automotive field.

8. The appellant comments on page 13 that, "**It is respectfully submitted that this is not the proper standard for determining whether the assertedly inherent characteristics necessarily flows from the teachings of the applied art."** As stated by the examiner in paragraph 5 above, the examiner is not relying on inherency, but on common knowledge available to one of ordinary skill in the automotive and vehicle battery charging arts. The rejection was formulated under 35 USC §103(a), therefore the correct standard to consider is obviousness, which involves an analysis of what one of ordinary skill in the art would know and what the references fairly teach or suggest.

9. The appellant comments on page 13 that, "**In this regard, it is respectfully submitted that a "bad battery" may simply be a battery that has run its useful life while the generator continues to function normally. Thus, it is not necessarily the case that a "bad battery" indicates a "bad generator" as asserted by the Final Office Action.** The examiner submits that a battery that has ran its useful life [i.e. a "dead battery"] would not be capable of being overcharged by a faulty generator regulator, It would simply be "dead", as opposed to overloaded. A "dead battery" would also not be able to power any loads to begin with, and hence would not be able to start the vehicle [and so bring into operation the diagnostic equipment]. The examiner further

notes that statistically, batteries are more prone to die at initial vehicle start-up versus during vehicle operation, further rendering the “bad battery” theory unlikely. This is also well-known in the art.

10. Appellant comments on page 13 that “**Further, the Final Office Action at page 10 also asserts that “it is entirely appropriate to measure the output of the generator in order to accomplish said diagnosing.”** This statement was offered by the examiner during prosecution in response to the appellant stating that "measuring the output of the generator is not the same as diagnosing the generator itself" [current Final Action page 10, Response to Arguments section]. As understood by the examiner, it is the electrical characteristics of the generator regulator that is being diagnosed. It is entirely appropriate to measure the output of the generator regulator in order to accomplish diagnosing, because:

a) It is the electrical characteristics of the generator regulator that is being measured, thus the output represents the easiest and most logical manner in which to accomplish such diagnostics. As shown above in paragraph 5, the positive terminals of the generator regulator, the battery, and the power management assembly 10 are all connected to the same + terminal, therefore measuring the output of one [the battery] also measures the output of the other [the regulator]; and

b) The instant invention also diagnoses the generator regulator by monitoring the vehicle + terminal, either directly or indirectly [see specification page 8 lines 28-34 and page 9 lines 18-21] and not by some other unexplained means.

11. The appellant shifts argumentation toward the Larson reference in the paragraph bridging pages 13 and 14 of the brief by stating, "**Further, the Larson reference also does not disclose (or even suggest) the feature in which the integrated module further includes an electronics unit for at least one of regulation of the generator and diagnosis of the generator as provided for in the context of claim 1. In particular, the Larson reference does not disclose (or even suggest) regulation of a generator and diagnosis of a generator.**" The examiner disagrees. As previously stated in paragraph 3 above, the limitation in question [***limitation A***]:

> "*wherein the integrated module further includes an electronics unit for at least one of regulation of the generator and diagnosis of the generator*" [claims 1 and 19]

requires either regulation of the generator or diagnosis of the generator, and not both. The Larson reference explicitly teaches the "**regulation** of the generator" feature.

12. Larson teaches a vehicle electrical system with a plurality of subsystems for supplying power to different component groups of the vehicle [Abstract], including supplying battery charging and accessory components installed on the vehicle [col. 2 lines 8-12]. Larson teaches an ESC 30 Body Controller Computer that outputs a control signal to three regulators 16, 21, and 22 [col. 3 lines 5-8]; at least one of which is a variable control signal that adjusts the output of the regulator [col. 3 lines 43-53, col. 4 lines 25-40]. Please refer to Larson's figure 2 reproduced below.

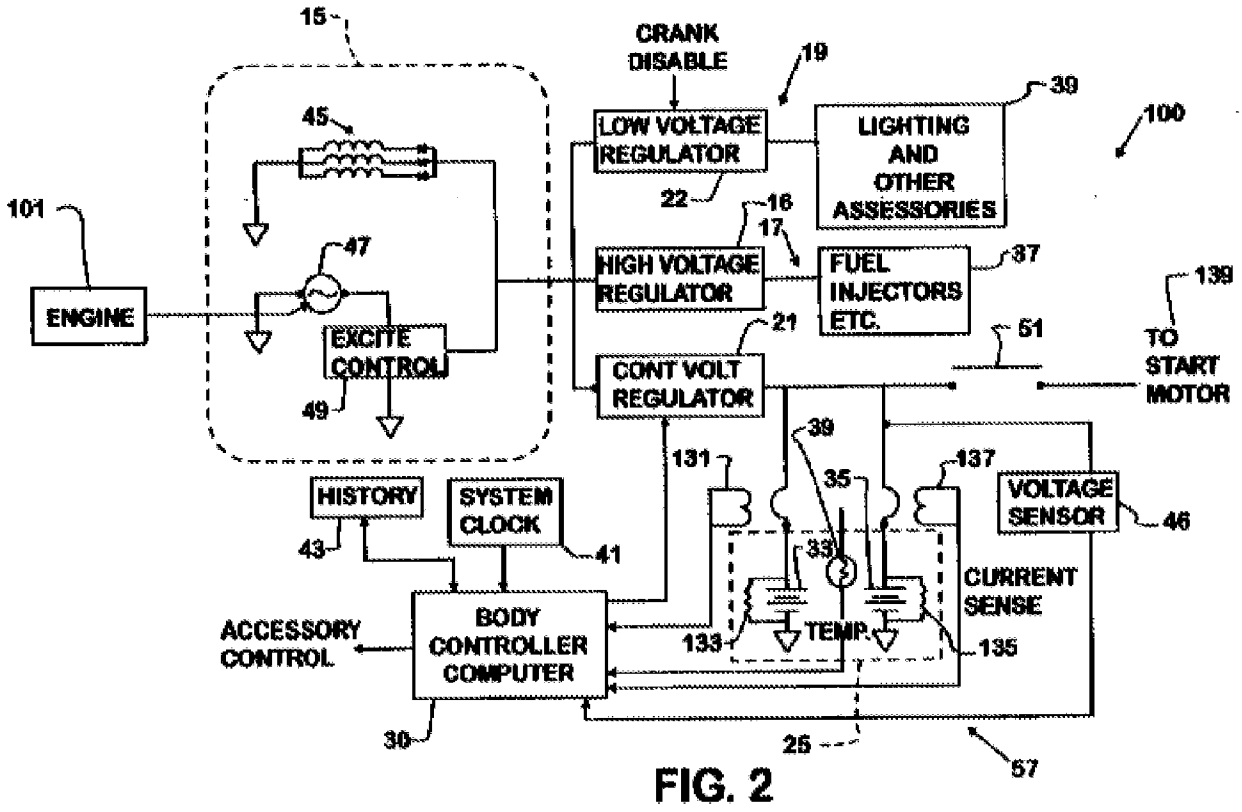


FIG. 2

Larson [U.S. 6,690,140] Fig. 2 showing a schematic of the vehicle electrical system

Larson [col. 3 lines 43-53] state:

> The output voltage level of controllable voltage regulator 21 is controlled by a control signal from ESC 30, either directly, or over the network. In addition to executing a battery charging management program for determining the level of the control signal for the controllable voltage regulator 21, ESC 30 may execute subsidiary battery diagnostic routines, the results of which may be displayed on gauge cluster 14. ESC 30 may also demand increased engine output from engine controller 20 if required for maintaining, or optimal charging of, battery pack 25. [Emphasis added].

Larson [col. 4 lines 25-40] state:

> Controllable voltage regulator 21 controls the voltage level applied to the (usually) positive terminal of a battery pack 25 and does not have a fixed output level. Instead, the output voltage from controllable voltage regulator 21 is set by the value of a control signal supplied from electrical system controller 30. The control signal is time varying and is set as a function in several variables. An output terminal of controllable voltage regulator 21 is connected to the positive terminals of battery (pack) 25, which may include more than one six cell lead acid battery, connected in parallel. Illustrated are two such batteries 33 and 35. Shown in parallel to batteries 33 and 35 are resistors 133 and 135 which represent the internal resistances of the corresponding batteries. The positive terminals of battery pack 25 are also connectable by a switch 51 to a starter motor 39 [emphasis added].

As seen in the underlined portions and in Fig. 2 above, ESC 30 [Body Controller Computer] actively controls the output of regulator 21; regulator 21 being directly supplied with current from alternator [generator] 15. The examiner submits that Larson expressly discloses a generator regulator, and such can be considered fact as evidenced by the underlined portions above.

13. Applicant comments on page 14, "**The Larson reference merely refers to a conventional alternator which provides a constant voltage D.C. output. (Larson, col. 3, lines 63-64; col. 5 lines 31-37; Figures 2 and 3, elements 15 and 115).**

The examiner submits the following points for consideration:

a) Whether or not Larson discloses a conventional alternator is not relevant, in light of what is claimed. ***Limitation A*** requires "regulation of the generator". There is no additional claim language as to whether the regulation should be unconventional [as applicant suggestively argues], conventional, variable output, or anything else other than *regulation of a generator* at face value. One of the design functions of a regulator is to maintain a constant output, while supplying changing loads. Another function is to vary the output within a predetermined range. Larson does both. Larson states in col. 3 lines 63-64 that: Power source 15 should provide a constant voltage D.C. output at a potential of about 14.3 volts. However, in the lines immediately preceding this portion, Larson also states that regulation of the generator's excitation field, as well as regulation of the input rotation of the generator's shaft, and regulation in order to vary the electrical output within an operating range [see paragraph 14 below].

b) There is no claim language that indicate whether the "regulation of the generator" should occur internal to the generator [*e.g. internal regulation of the generator's excitation field*], whether the regulation should occur at the input of the generator [*e.g. rotational speed input of the generator's shaft by controlling engine speed*], or whether the regulation should occur at the output of the generator [*e.g. controlling the electrical output of the generator with a regulator*]. Therefore, any one of the three interpretations satisfy the limitation "regulation of a generator" in a broad and reasonable manner.

14. That said, the examiner notes that Larson teaches *all three* of the potential interpretations listed in paragraph 13(b) above, pertaining to the "regulation of the generator" feature:

Larson teaches *internal regulation of the generator's excitation field* in col. 3 lines 55-63:

> Electrical power system 100 is directed primarily to distributing electrical power generated by an engine 101 driven electrical power source 15, such as an alternator, or generator. Electrical potential is induced in and rectified in power element 45 by a rotor 17. The amount of power generated is controlled by feedback of the output voltage level by an excitation controller 49 which controls the current through magnetic field generating rotor 47. [See also col. 5 lines 30-36].

Larson teaches *regulation of the rotational speed of the generator* in col. 3 lines 50-53:

> ESC 30 may also demand increased engine output from engine controller 20 if required for maintaining, or optimal charging of, battery pack 25. [See also col. 5 lines 30-36].

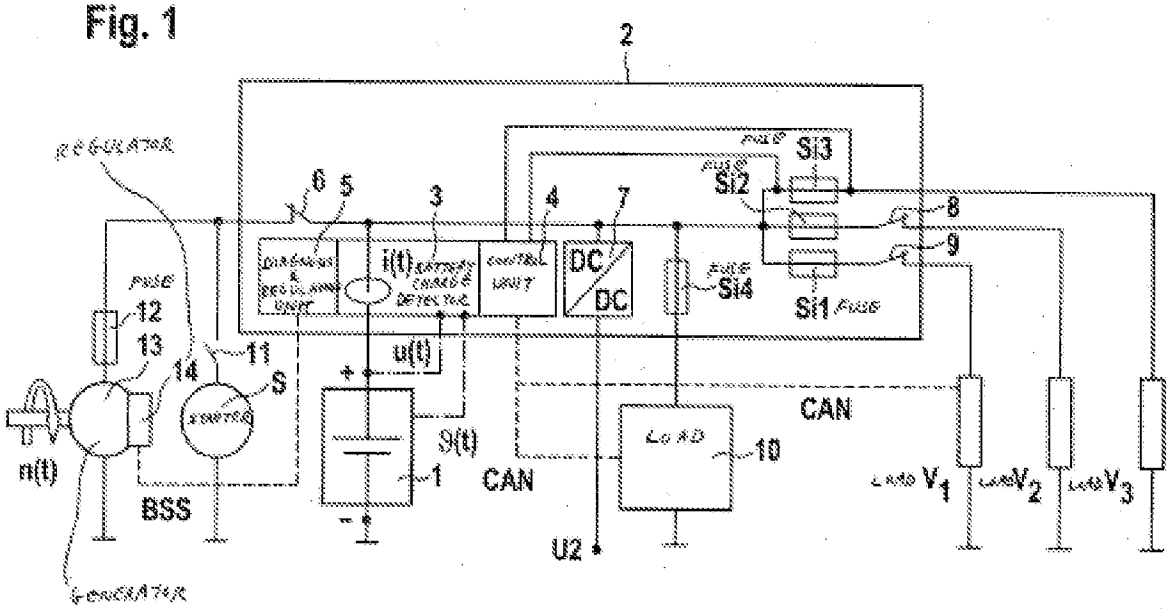
Larson teaches *controlling the electrical output of the generator with a regulator* in col. 3 lines 43-45:

> The output voltage level of controllable voltage regulator 21 is controlled by a control signal from ESC 30, either directly, or over the network. [See also col. 4 lines 25-40].

It is understood that any of the three interpretations is reasonable and can be applied; however, the last interpretation [*controlling the electrical output of the generator with a regulator*] appears most consistent with the appellant's own specification. Appellant's specification on page 9 lines 18-22 is illustrative:

> Generator 13 [see Appellant's Figure 1 reproduced below] is also connected to a regulator 14 which, in turn, is in contact with unit 5 for the diagnosis and regulation of the generator provided within module 2, via a bit synchronized interface BSS [the dashed line connecting Diagnosis and Regulation Unit 5 to Regulator 14].

Fig. 1



Instant application 10/688,533, DRW date 10/16/2003 Figure 1 reproduced. Regulation Unit 5 controls Regulator 14 via the BSS connection in order to regulate the output of generator 13.

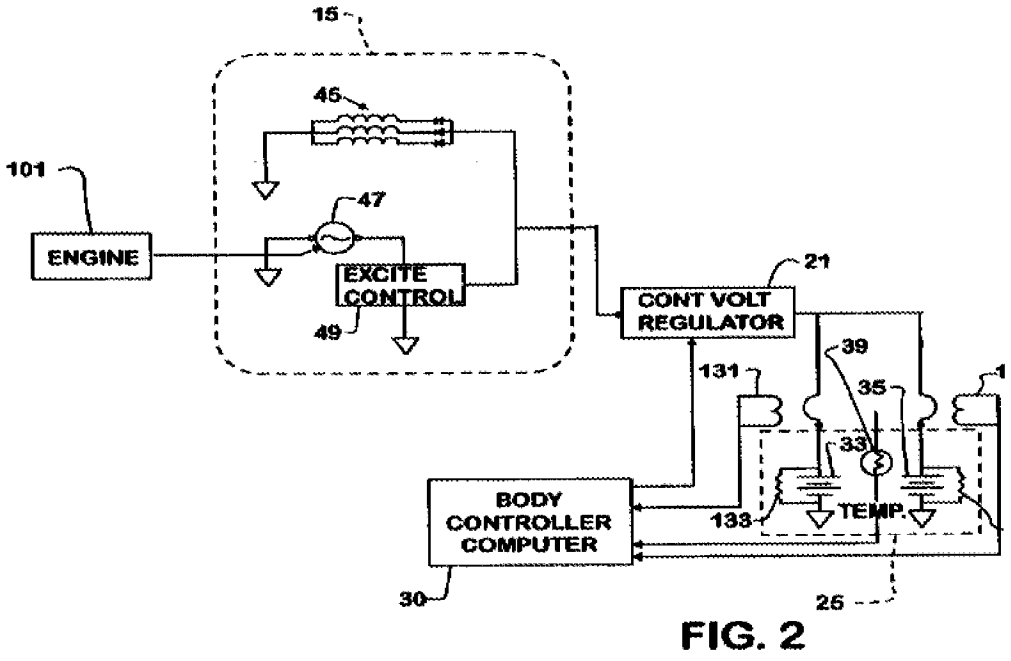


FIG. 2

Larson's Figure 2 ***extracted portion****: ESC (Body Controller Computer) 30 controls Voltage Regulator 21 via the "control arrow" signal in order to regulate the output of alternator 15.*

As seen above, a side-by-side comparison of the "regulation of the generator" feature of the instant invention [Fig. 1, specification page 8 lines 28-34 and page 9 lines 18-22] with the Larson reference [Fig. 2 col. 3 lines 43-45 and col. 4 lines 25-40] show that ***limitation A*** is taught by the Larson reference as claimed, and in a manner similar to that disclosed by the instant application.

15. Appellant argues on page 14 that, "**Nowhere does the Larson reference indicate that its ESC regulates the alternator and diagnoses the alternator.**" ***Limitation A*** requires either regulation of the generator or diagnosis of the generator. Larson is seen to disclose regulation of the generator [see paragraph 14 above].

16. Appellant argues on page 14 that, "**The Larson reference merely refers to a controllable regulator that receives constant voltage from the alternator and controls the voltage sent to the battery for recharging (Larson col. 4 lines 25-40; col. 6 lines 47-49; and col. 6 lines 56-60).**" The "constant voltage" portion of this argument has already been responded to in paragraphs 13 and 14 above. As to the "battery charging" portion, it is agreed that one of the purposes of regulating the generator in Larson is to control battery charging. Col. 4 lines 25-40 state:

> Controllable voltage regulator 21 controls the voltage level applied to the (usually) positive terminal of a battery pack 25 and does not have a fixed output level. Instead, the output voltage from controllable voltage regulator 21 is set by the value of a control signal supplied from electrical system controller 30. The control signal is time varying and is set as a function in several variables. An output terminal of controllable voltage regulator 21 is connected to the positive terminals of battery (pack) 25, which may

include more than one six cell lead acid battery, connected in parallel. Illustrated are two such batteries 33 and 35. Shown in parallel to batteries 33 and 35 are resistors 133 and 135 which represent the internal resistances of the corresponding batteries. The positive terminals of battery pack 25 are also connectable by a switch 51 to a starter motor 39. [Emphasis added].

Therefore it is evident that Larson discloses varying the output of generator regulator 21 in order to accomplish controlled battery charging. The examiner notes that:

a) There is no language in ***limitation A***, or elsewhere, that prohibits the purpose of the regulation to be used for [or *not* used for] battery charging. Indeed, all claims recite open-ended terms such as "comprising" or "having".

b) Appellant's own specification states that the purpose of regulating the generator is for battery charging. Page 7 lines 5-11 state:

Control unit 4 is also connected to unit 5 for diagnosis and regulation of generator 13, and the control unit 4 is therefore also able to consider information concerning the state of the generator for electrical power management, as well as initiate a regulation of the generator, based on which the state of charge of the battery is rapidly increased again in the event of a weak battery. [Emphasis added].

17. Appellant argues on pages 14 and 15 that, "**Moreover, the Larson reference specifically teaches away from (this) feature of claim 1. The Larson reference requires a constant voltage D.C. output from the alternator, and refers to several voltage regulators that separately modify the constant voltage received from the**

alternator and supply each of low voltage, intermediate voltage, and high voltage systems independently of one another. (Larson col. 3 lines 6-15).

The examiner submits the following:

a) There is no language in ***limitation A***, or elsewhere, that prohibits the purpose of the regulation to be used for [or *not* used for] powering additional loads. Indeed, all claims recite open-ended terms such as "comprising" or "having".

b) Appellant's own specification states that the purpose of regulating the generator is for supplying loads. Page 6 lines 6-13; page 7 lines 5-11 and page 7 lines 12-16 state:

> The battery voltage u(t) and battery temperature 6(t) are measured using external sensors, which provide information concerning the battery voltage or the battery temperature, respectively. From the measured battery current, the measured battery voltage and the measured battery temperature, a signal describing the battery state of charge is determined, which is provided to control unit 4 for electrical power management.
>
> Control unit 4 …initiates a regulation of the generator, based on which the state of charge of the battery is rapidly increased again in the event of a weak battery.
>
> Using DC-DC converter 7, which is also situated within module 2, the supply voltage derived from battery 1 is converted into another supply voltage U2, which is needed by additional consumers not shown in Figure I.

c) There is no language in ***limitation A***, or elsewhere, that prohibits the output of the generator from having a constant voltage that is then input to a controllable regulator. There is also no language to indicate that the output should be varying.

d) It is not clear whether appellant's own *regulation of the generator* uses a constant output *or* variable output from the generator, before the regulator controls it. Either way, if appellant is asserting *internal regulation of the generator*, Larson is still seen to read on ***limitation A*** as currently worded, as well as explicitly disclosing *internal regulation of the generator excitation field* [see paragraph 14 above].

18. Appellant comments on page 15 that **"The Hatton reference does not cure- and is not asserted to cure- the critical deficiencies of the Marusak and Larson references."** The examiner agrees that the Hatton reference was not used to teach ***limitation A***. The Hatton reference was used to teach the "*detection arrangement for diagnosis of a state of at least one of the fuses"* limitation of claims 1 and 19 [see page 5 of the Final Action]. The examiner disagrees that there are any critical deficiencies in Marusak and Larson. Although only required to show one of the features of ***limitation A***, the examiner submits that both features are taught by Marusak and Larson. Marusak's teachings combined with knowledge available to one of ordinary skill in the art, teaches the "*diagnosis of the generator*" feature as seen in paragraphs 4-10 above; while Larson teaches the "*regulation of the generator*" feature as seen in paragraphs 11-17 above. Proper motivation to combine is as given on page 5 of the Office Action.

19. Appellant argues that**, "Claims 2, 3, 6 to 8, 10-12, and 15-18 depend from 1 and are therefore allowable for the same reasons as claim 1."** The examiner

disagrees. Independent claim 1 is not allowable as explained above, therefore the dependent claims cannot be allowable for non-existent reasons.

20. Appellant shifts argument to independent claim 19 on pages 15 and 16 by stating, **"It is believed and respectfully submitted that any review of the applied references makes plain that they do not (whether taken alone or combined) disclose or suggest this combination of features. This is evidenced by the fact that the Final Office Action does not --and cannot—explain how the applied references disclose this combination of features as provided for in the context of the remainder of the claim 19."** As stated in the action, claim 19 is similar in scope to claim 1 and the claims that depend from claim 1; and is therefore subject to the same rejection under Marusak in view of Larson in view of Hatton. As stated in the action, claim 20 is similar in scope to claims 16-18; and is therefore subject to the same rejection under Marusak in view of Larson in view of Hatton. [See pages 8-9 of the Office Action]. To the extent the appellant may be commenting on the appropriateness of the motivation to combine all of the previously rejected dependent claims under one independent claim, the examiner notes that in the instant case the motivation would remain the essentially the same, regardless of the order in which the limitations are presented as in independent claim 19.

21. In order to clarify the record and fully rebut the appellant's argument, the examiner presents a full item-to-item matching of the features of independent claim 19 in paragraphs 22-26 below:

22. **Claims 1-3, 6-8, 10-12, 15-18 and 19-22 are rejected under 35 U.S.C. 103[a] as being unpatentable over Marusak [U.S. 20040048142] in view of Larson [U.S. 6690140] in further view of Hatton [U.S. 5739737].** [See Office Action page 3].

23. With respect to claim 19 (New), Marusak discloses a vehicle electrical system **[pars. 0001-0002]** powered by a battery **[Fig. 1 battery 12]** to supply a plurality of loads **[par. 0011 lines 1-4; par. 0033 lines 1-5; Fig. 2 power feed output connectors 80, 82, 84, 86]**, comprising:

an integrated module **[Fig. 1, power management and distribution assembly 10]** positioned between a positive terminal of the battery **[Fig. 1, + terminal at 138]** and the plurality of loads **[par. 0029, par. 0031 lines 1-5]**, the integrated module having:

an arrangement for detecting a state of charge of the battery **[par. 0010 lines 1-5, par. 0043 lines 8-12]** and including a battery current measuring device **[par. 0030 lines 1-10]**, and

a terminal at which a generator is connectable **[Fig. 2, the generator/alternator connects to either the battery positive terminal 16 or any of the power connectors 96-110; par. 0034]**;

one of a battery disconnecting switch **[Fig. 2, cutout switch assembly 58; par. 0031]** and a battery disconnecting fuse **[Figs. 1 and 5, any of fuses 70;**

par. 0008 lines 1-5; par. 0011 lines 1-4; also par. 0033] situated between the battery and the terminal;

a control unit for power management **[Figs. 1 and 5, energy management module 56; par. 0030]** of the vehicle electrical system;

at least one supply output for supplying power to the loads **[Figs. 1 and 5, 80, 82, 84; par. 0033, also par. 0034]**;

a fuse module **[Fig. 1, the housing portion under cover 122 contains fuses 70; Fig. 2, the housing portion 18 contains fuses 88]** having an input, a plurality of supply outputs, and a plurality of fuses **[Fig. 2, fuses 90, 92, 94]** that connect the plurality of supply outputs to the input **[par. 0033]**;

a switch **[Fig. 2, cutout switch assembly 58]** provided within the fuse module **[housing portion 18 is the module that contains fuses 70, as shown in Fig. 2]**, wherein the switch enables selective connection and disconnection between at least one of the plurality of fuses and an associated load **[par. 0030 lines 10-14 and par. 0031]**

a battery voltage sensor located outside the integrated module **[par. 0041, comprising input voltage sensing pins 154, 156, 158, 160 for sensing voltage from outside the module]**; and

a plurality of fuses **[Fig. 2, fuses 90, 92, 94]**;

wherein a terminal of the integrated module is connected to the input of the fuse module, and wherein the plurality of supply outputs of the fuse module provide power to the plurality of loads **[Figs. 1 and 2, pars. 0031-0033]**,

wherein the integrated module further includes an electronics unit for **at least one of** diagnosis of the generator **[Figs. 1 and 5, 56 in conjunction with 58; par. 0029 lines 1-3; par. 0010 lines 1-5 it is well-known that a failure in the generator regulator would result in an overloaded (i.e. overcharged or undercharged) condition of the battery. Marusak's energy management subassembly 10 emits an overload signal that is a diagnostic signal showing the maximum operating parameters of the battery have been exceeded. One of ordinary skill would understand this overload signal showing the maximum operating parameters as exceeded to be suggestive of an *overcharged condition of the battery*, or *too much load applied to the battery*- in other words, an overloaded battery signal *serves as a suggestion of a failed generator regulator overcharging the battery [in the case of overcharge], or undercharging of the battery [in the case of being unable to adequately supply the vehicle load]*. In either case, the generator regulator has failed to properly charge the battery, and the generator regulator failure is detectable via Marusak's battery diagnostic feature as seen in par. 10. See Examiner's Answer paragraphs 4-6 above for further comments],**

wherein the arrangement for detecting the state of charge of the battery includes a battery voltage meter **[par. 0041 voltage sensor pins are used to detect the state of charge of the battery for battery management, and to display it on the dashboard of the vehicle par. 0030]** that cooperates with the battery voltage sensor,

wherein the arrangement for detecting the state of charge of the battery includes a battery current meter **[par. 0030],**

wherein the integrated module has a plurality of supply outputs, and

wherein the plurality of fuses connect the plurality of supply outputs to the battery, whereby power is provided via the plurality of supply outputs to the plurality of loads **[pars. 0031-0033].**

24. **Marusak does not disclose an electronics unit for regulation of the generator [see Examiner's Answer paragraphs 2 and 3 above], or a detection arrangement for diagnosis of a state of at least one of the fuses.**

25. Larson discloses the vehicle electrical system **[Abstract]** wherein the integrated module further includes an electronics unit **[ESC 30 Body Controller Computer outputs a control signal to three regulators 16, 21, and 22; col. 3 lines 5-8]** for at least one of regulation of the generator **[col. 3 lines 43-53, col. 4 lines 25-40 describes how ESC 30 regulates the generator regulator output at least generator regulator 21 receives a control signal from ESC 30 to vary/regulate its output].**

Marusak and Larson are analogous vehicle electrical system modules for managing vehicle power.

At the time of the invention it would have been obvious to one of ordinary skill in the art to expressly add the generator regulation feature found in Larson to Marusak's power management module, for the benefit of providing an integrated means for the vehicle electrical system to control the generator regulator, and so adjust the rate of charging as required. This is an important requirement for any type of vehicle that could conceivably impact human safety [such as an automobile] or lead to equipment damage [an overcharged battery could result in an explosion]. Regulating the generator's charging of the battery is important, as neglecting this can lead to battery overheating, sulfation, and reduced battery life- **Larson, col. 1 lines 40-65**; as well as potential battery explosion. Modularization into one power management module offers the

benefits of reduction in costs, enablement of the devices to work together to monitor the battery and loads, and incorporate battery protection features **[Marusak, par. 0043].**

26. **The combination of Marusak and Larson as described above do not disclose a detection arrangement for diagnosis of a state of at least one of the fuses.**

Marusak, Larson, and Hatton are analogous vehicle electrical system modules for managing vehicle power.

Hatton discloses an integrated module **[Fig. 1, blown fuse indicator module 10]** with a detection arrangement for diagnosis of a state of at least one of the fuses **[col. 2 lines 47-64; col. 4 lines 18-63]**.

At the time of the invention it would have been obvious to one of ordinary skill in the art to add Hatton's blown fuse indicator module to the combination of Marusak's and Larson's fused power management module.

The benefits for doing so would be to enhance convenience to the user in locating the blown fuse **[Hatton, col. 1 lines 24-36]**, and allow the user/technician to be more effective in diagnosing malfunctions, which would result in reduced downtime for the vehicle and reduced cost to the user.

27. Additionally, the following applies to the placement of ALL of the limitations/features into one integrated module: the concept of taking multiple commonly known automobile components/modules/features and forming them into one integrated module is in general only a simple modification in the automotive arts [particularly considering the widespread use of modularization in this industry]; since it has been held that forming and putting together into one piece an article which has formerly been formed in two pieces involves only routine skill in the art. ***In re Larson, 340 F.2d 965, 968, 144 USPQ 347, 349 [CCPA 1965]. See MPEP 2144.04.***

END OF CLAIM 19 REJECTION

28. Appellant shifts argumentation to case law analysis on pages 16-19 of the brief. Appellant first states that "**the Answer reflects a subjective obvious to try standard**" on page 16, and that "**there is no proper evidence of obviousness…**" on page 18. The examiner believes that under the 35 U.S.C 103(a) combination given using Marusak, Larson, and Hatton, it would have been obvious to *do*, and not simply try, to combine the teachings of all three references to accomplish appellant's claim, since all the features were known and there is explicit motivation to combine given in each reference. Appellant further comments **"…One cannot use hindsight reconstruction…".** The examiner submits that hindsight is not a factor here since explicit motivation to combine is found in each reference, and the references used are found in the same analogous art.

29. Appellant argues on pages 17 and 18 that, **"Conspicuously missing from this record is any evidence …necessary to arrive at the claimed [invention]"** The examiner submits that paragraphs 4-10 of this Answer serves as adequate evidence that Marusak combined with common knowledge teaches the "diagnosis of the generator" feature; and paragraphs 11-17 serve as adequate evidence that Larson teaches the "regulation of the generator" feature.

30. The appellant comments on page 19 that **"...claims 1-3, 6-8, 10-12, and 15 to 22 are allowable…"**. The examiner disagrees. The claims are not allowable for the reasons set forth in this Answer.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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